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# Amperometric enzyme immunosensor for the determination of the antigen of the pathogenic fungi *Trichophyton rubrum*

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**Abstract**

An amperometric enzyme immunosensor for the determination of antigen (Ag) of pathogenic fungi *Trichophyton rubrum* (TR) was developed. The immunosensor is based on a specific immunoreaction of Ag with antibodies which were immobilized together with cholinesterase into a nitrocellulose membrane (biosensitive part of immunosensor). The biosensitive part could be regenerated and is stable for at least 35 days. The developed immunosensor allows the determination of down to $1\times10^{-15}$ mg ml$^{-1}$ of Ag TR. The total time of immunoassay is less than 20 min. The method was applied for the determination of Ag TR in human blood serum. 

*Keywords:* Amperometric enzyme immunosensor; *Trichophyton rubrum*; Immunoassay

## 1. Introduction

*Trichophyton rubrum* (TR) is a pathogenic fungus which causes common cutaneous diseases such as mycosis. Up to now the diagnosis of the diseases is very difficult and labor consuming. In recent years importance of this problem is emphasized by the use of immunosupression as therapy since fungal infections are very dangerous in this situation. The availability of effective but toxic antifungal drugs has also sharpened the need to understand when a progressive disease is present and when a patient can effectively control the presence of a fungus and to recover from the disease [1,2]. Fungi are generally excellent antigens and a method for the determination of low concentrations of antigen makes fast diagnosis of the diseases possible. Thus, development of new effective (quick, sensitive and selective) methods for the determination of antigens of pathogenic fungi is important.

Nowadays an increase of the frequency of mycosis, alteration of its forms and type of cause of diseases are observed. Detection of fungi which caused mycosis is a very important problem for the diagnosis of the disease, especially during the initial stage and when some un-infectional changes of the skin are presented. Mycology diagnosis of the diseases is based on detection of fungi by microscopy of diseased skin or by cultural investigations [3]. In both cases fungi which caused the disease could be detected only with 50% plausibility. Other methods of detection of pathogenic fungi (immunological or serological) in mycological practice are absent. Frequently similar clinical pictures of diseases of a skin caused by different fungi and bacteria or infection are observed. In these cases conventional diagnosis is impossible. For correct medical

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